

Appl. No. : 10/616,693  
Filed : July 10, 2003

### REMARKS

This amendment is being submitted in response to the Office Action mailed May 18, 2005. In this amendment, Claims 1 and 15 are amended. (Claim 15 has been amended to depend from Claim 14 to provide antecedent basis for the frequency modulator.) Claims 16-48 are pending but withdrawn from consideration. New Claims 49-51 are added.

### Election/Restrictions

In the Response to the Restriction Requirement mailed April 25, 2005, Applicant elected Species I, Claims 2-11. Applicant notes a discrepancy, however, with the Office Action mailed May 18, 2005, which lists Claims 1-15 as pending and does not list any claims as being pending but withdrawn from consideration. Claims 16-48 have not been canceled and are presumed pending but withdrawn from consideration. Accordingly, Applicant lists Claims 16-48 as “(Withdrawn)” in the listing of claims that begins on page 2. If applicant is incorrect, Applicant respectfully requests clarification by the Examiner.

### Claim Objections

Claim 1 is objected to as lacking antecedent basis for the recitation of a first port, a second port, and a third port. The Office Action states that antecedent basis is lacking because “the photonic-bandgap fiber does not couple to the directional coupler that is directly coupled to the light source.”

Claim 1, however, does not recite that the first port of the directional coupler is *directly coupled* to the light source. Claim 1 recites that the first port is *optically coupled* to the light source. Proper antecedent basis is provided for the first port being *optically coupled* to the light source. New dependent Claims 49-51 provide additional clarification. In particular, new Claim 49 recites a second directional coupler optically coupled to the light source and to the first port of the first directional coupler. Applicants therefore respectfully request that the objection be withdrawn.

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**Claim Rejections – 35 U.S.C. § 102**

Claims 1-3 and 8-11 are rejected under 35 U.S.C. § 102(b) as being anticipated by Greenaway (U.S. Patent No. 6,389,187 B1). Greenaway, however, does not anticipate Claims 1-3 and 8-11, because Greenaway does not include each element recited in these claims. For example, Greenaway does not disclose a *hollow-core* photonic-bandgap fiber. Nor does Greenaway disclose an optical loop. Since Greenaway does not anticipate, Applicants respectfully request that the rejection of Claims 1-3 and 8-11 under 35 U.S.C. § 102(b) be withdrawn.

**Claim Rejections – 35 U.S.C. § 103**

Claims 4-7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Greenaway in view of Michal (U.S. Patent No. 6,108,086). Claims 12-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Greenaway in view of Sanders (U.S. Patent No. 5,563,705).

None of the cited references, taken alone or in any combination, however, teaches or suggests the limitations recited in Claims 4-7 and 12-15. For example, neither Greenaway, Michal, or Sanders, alone or in combination teach or suggest *hollow-core* photonic-bandgap fiber.

As recited in the application at paragraph [0044], line 1, “the use of hollow-core photonic-bandgap fiber instead of conventional optical fiber in a Sagnac interferometer may substantially reduce noise and error introduced by Rayleigh backscattering, the Kerr effect, and the presence of magnetic fields.” In hollow-core photonic-bandgap fiber, the optical mode power is mostly confined to the hollow core, which may comprise, for example, air, another gas, or vacuum. Rayleigh backscattering as well as Kerr nonlinearity and the Verdet constant are substantially less in air, other gases, and vacuum than in silica, silica-based materials, and other solid optical materials. The reduction of these effects coincides with the increased fraction of the optical mode power contained in the hollow core of the photonic-bandgap fiber.

Accordingly, Applicants submit that Claims 4-7 and 12-15 are patentable over the references. Applicants therefore respectfully request that the rejection of Claims 4-7 and 12-15 be withdrawn.

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**Comments on Withdrawn Claims**

The Restriction Requirement mailed April 25, 2005 states that Claim 1 is generic. Applicant maintains that Claim 1, as amended, remains generic. Accordingly, Applicant respectfully request consideration of Claims 16-22 upon allowance of Claim 1. Applicant also considers Claims 23-48 generic with respect to the Species I and II set forth in the Restriction Requirement. Applicant therefore requests consideration of Claim 23-48 as well.

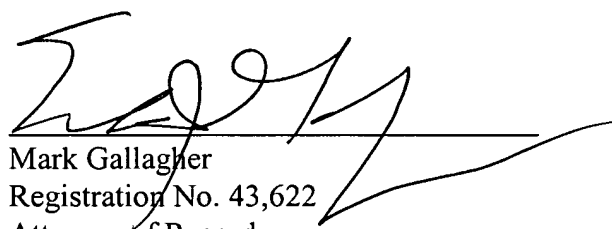
**Conclusion**

Applicant submits that Claims 1-15 and 49-51, as well as Claims 16-48, are in condition for allowance and such action is earnestly solicited. If the Examiner has any questions regarding the foregoing, the Examiner is invited to contact the undersigned at the phone number listed below.

Respectfully submitted,

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